DATA SHEET

NEC

BIPOLAR ANALOG INTEGRATED CIRCUIT

μPC4741

HIGH PERFORMANCE QUAD OPERATIONAL AMPLIFIER

DESCRIPTION

The μPC4741 consists of four independent frequency compensated operational amplifiers featuring higher speed, broader band than general purpose type as 741. The μPC4741 is most appropriate for AC signal amplifier applications such as active filters or pulse amplifiers.

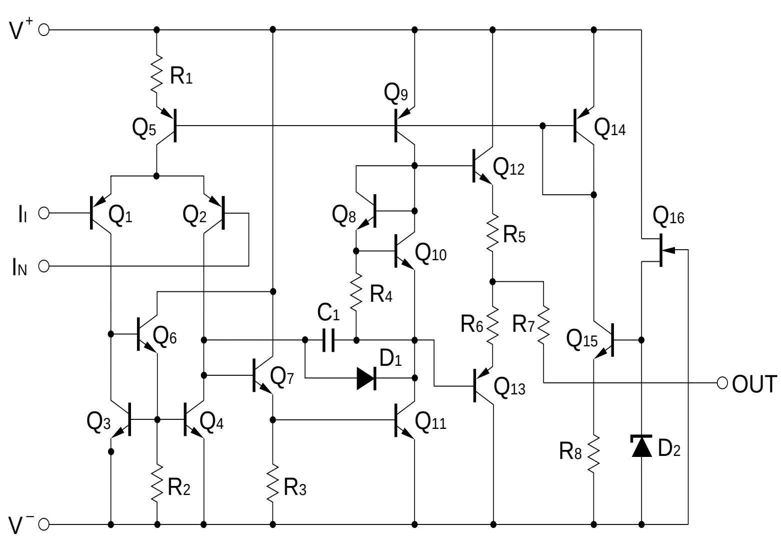
FEATURES

- Internal frequency compensation
- Low noise
- Output short circuit protection

ORDERING INFORMATION

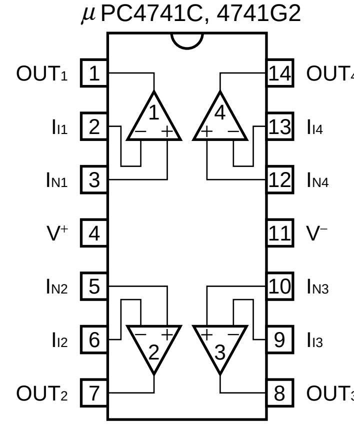
Part Number	Package
μPC4741C	14-pin plastic DIP (7.62 mm (300))
μPC4741C(5)	14-pin plastic DIP (7.62 mm (300))
μPC4741G2	14-pin plastic SOP (5.72 mm (225))
μPC4741G2(5)	14-pin plastic SOP (5.72 mm (225))

EQUIVALENT CIRCUIT (1/4 Circuit)



PIN CONFIGURATION (Top View)

μPC4741C, 4741G2



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Not all devices/types available in every country. Please check with local NEC representative for availability and additional information.

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Date Published February 2002 NS CP(K)
Printed in Japan

The mark ★ shows major revised points.

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C)

Parameter		Symbol	Ratings	Unit
Voltage between V^+ and V^- Note1		$V^+ - V^-$	–0.3 to +40	V
Differential Input Voltage		V_{ID}	±30	V
Input Voltage Note2		V_I	V^-–0.3 to V^+ +0.3	V
Output Voltage Note3		V_O	V^-–0.3 to V^+ +0.3	V
Power Dissipation	C Package Note4	P_T	570	mW
	G2 Package Note5		550	mW
Output Short Circuit Duration Note6			10	sec
Operating Ambient Temperature		T_A	–20 to +80	°C
Storage Temperature		T_{stg}	–55 to +125	°C

Notes 1. Reverse connection of supply voltage can cause destruction.

2. The input voltage should be allowed to input without damage or destruction. Even during the transition period of supply voltage, power on/off etc., this specification should be kept. The normal operation will establish when the both inputs are within the Common Mode Input Voltage Range of electrical characteristics.

3. This specification is the voltage which should be allowed to supply to the output terminal from external without damage or destructive. Even during the transition period of supply voltage, power on/off etc., this specification should be kept. The output voltage of normal operation will be the Output Voltage Swing of electrical characteristics.

4. Thermal derating factor is –7.6 mW/°C when ambient temperature is higher than 50°C.

5. Thermal derating factor is –5.5 mW/°C when ambient temperature is higher than 25°C.

6. Pay careful attention to the total power dissipation not to exceed the absolute maximum ratings, Note 4 and Note 5.

RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	MIN.	TYP.	MAX.	Unit
Supply Voltage	$V^\pm$	±4		±16	V

μPC4741C, 4741G2

ELECTRICAL CHARACTERISTICS (T_A = 25°C, $V^{\pm}$ = ±15 V)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Input Offset Voltage	V_{IO}	$R_S \leq 100\ \Omega$		±1.0	±5.0	mV
Input Offset Current Note	I_{IO}			±30	±50	nA
Input Bias Current Note	I_B			70	300	nA
Large Signal Voltage Gain	A_V	$R_L \geq 2$ kΩ , V_O = ±10 V	25,000	50,000		
Power Consumption	Pd	I_O = 0 A, All Amplifiers		150	210	mW
Common Mode Rejection Ratio	CMR		80	100		dB
Supply Voltage Rejection Ratio	SVR			50	100	μV/ V
Maximum Output Voltage	V_{om}	$R_L \geq 10$ kΩ	±12	±13.7		V
Maximum Output Voltage	V_{om}	$R_L \geq 2$ kΩ	±10	±12.5		V
Common Mode Input Voltage Range	V_{ICM}		±12	±14		V
Slew Rate	SR	A_V = 1		1.6		V/ μs
Input Equivalent Noise Voltage Density	e_n	f = 1 kHz		9		nV/$\sqrt{\text{Hz}}$
Channel Separation		f = 10 kHz		108		dB

Note Input bias currents flow out from IC. Because each currents are base current of PNP-transistor on input stage.

μPC4741C (5), 4741G2 (5)

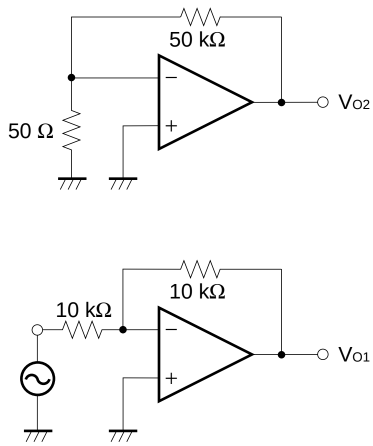
ELECTRICAL CHARACTERISTICS (T_A = 25°C, $V^{\pm}$ = ±15 V)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Input Offset Voltage	V_{IO}	$R_S \leq 100\ \Omega$		±1.0	±2.0	mV
Input Offset Current Note	I_{IO}			±30	±50	nA
Input Bias Current Note	I_B				100	nA
Large Signal Voltage Gain	A_V	$R_L \geq 2$ kΩ , V_O = ±10 V	28,000	50,000		
Power Consumption	Pd	I_O = 0 A, All Amplifiers		150	210	mW
Common Mode Rejection Ratio	CMR		85	90		dB
Supply Voltage Rejection Ratio	SVR				50	μV/ V
Maximum Output Voltage	V_{om}	$R_L \geq 10$ kΩ	±12.5	±13.7		V
Maximum Output Voltage	V_{om}	$R_L \geq 2$ kΩ	±11	±12.5		V
Common Mode Input Voltage Range	V_{ICM}		±13	±14		V
Slew Rate	SR	A_V = 1		1.6		V/ μs
Input Equivalent Noise Voltage Density	e_n	f = 1 kHz		9		nV/$\sqrt{\text{Hz}}$
Channel Separation		f = 10 kHz		108		dB

Note Input bias currents flow out from IC. Because each currents are base current of PNP-transistor on input stage.

MEASUREMENT CIRCUIT

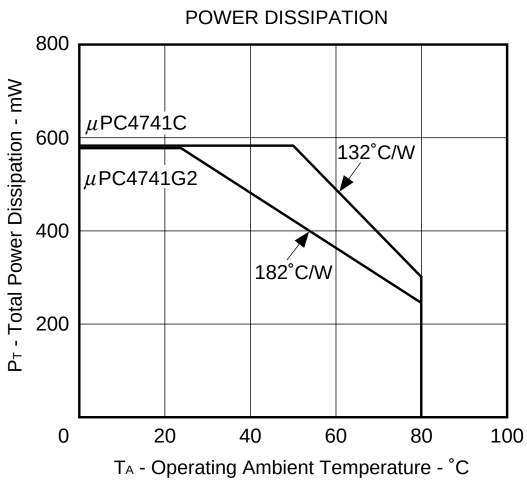
Fig.1 Channel Separation Measurement Circuit

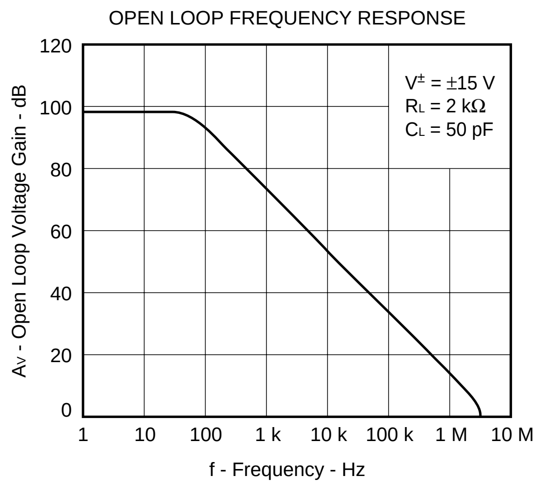


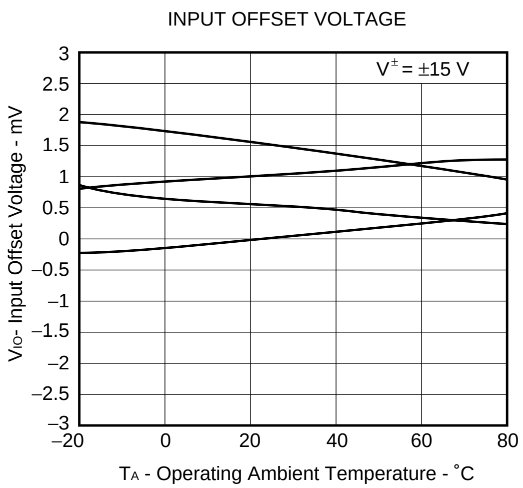
Channel Separation

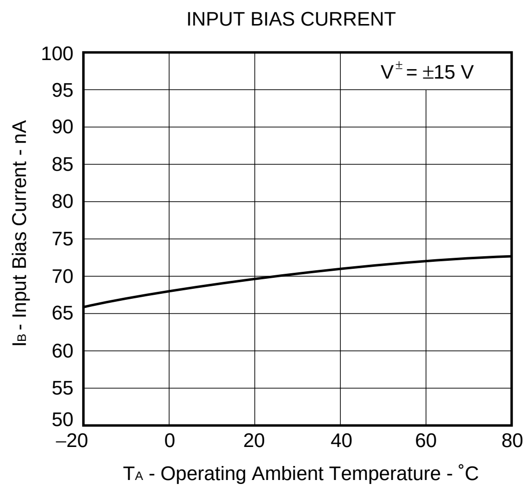
$$= \left| 20 \cdot \log \left(\frac{1}{1000} \cdot \frac{V_{O2}}{V_{O1}} \right) \right|$$

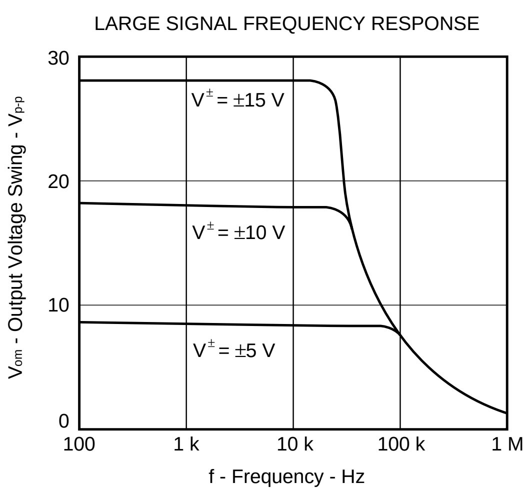
TYPICAL PERFORMANCE CHARACTERISTICS (T_A = 25°C, TYP.)

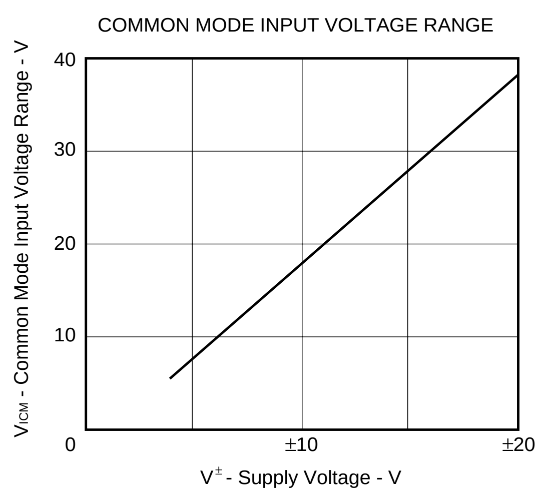


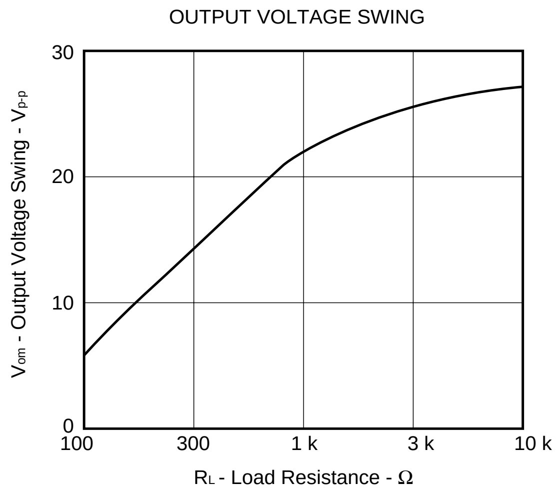


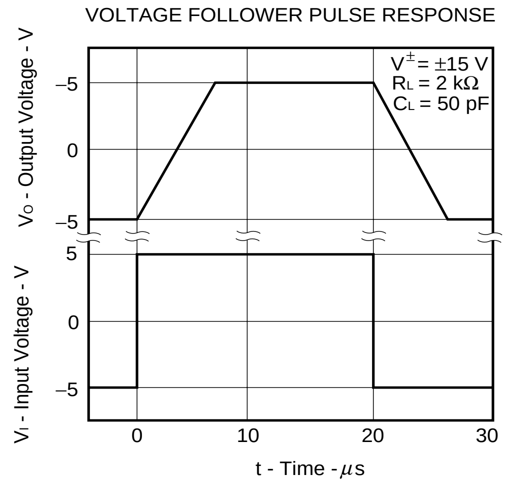


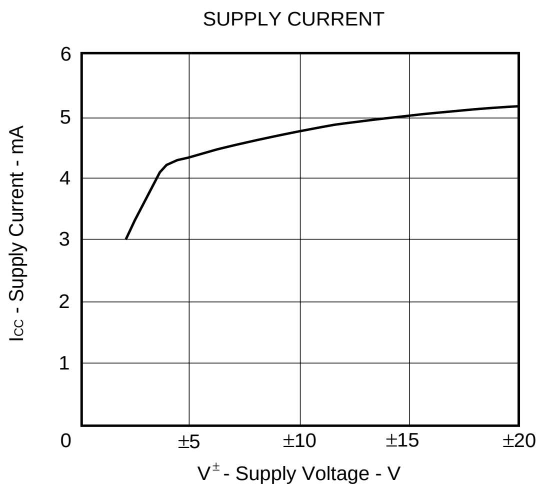


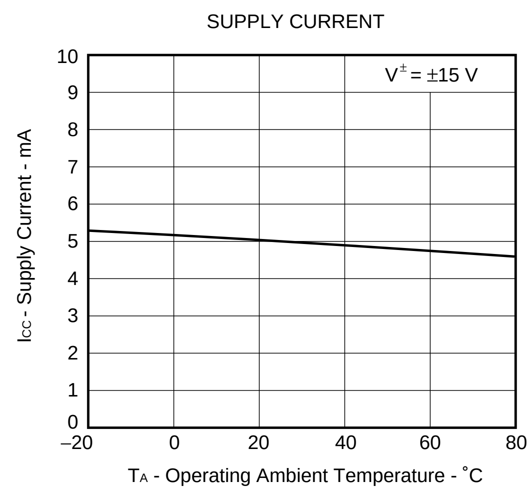


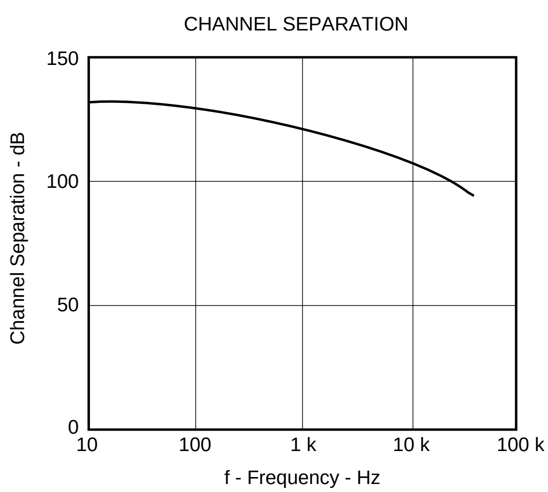


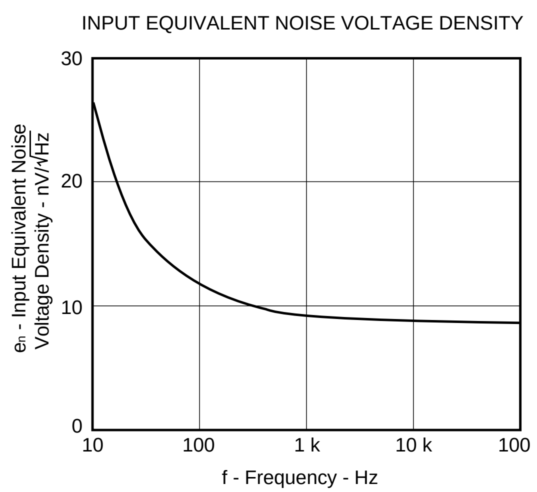

OUTPUT VOLTAGE SWING
Vom - Output Voltage Swing - Vp-p
30
20
10
0
100
300
1 k
3 k
10 k
RL - Load Resistance - Ω


VOLTAGE FOLLOWER PULSE RESPONSE
V± = ±15 V
RL = 2 kΩ
CL = 50 pF
VO - Output Voltage - V
VI - Input Voltage - V
t - Time - μs


SUPPLY CURRENT
ICC - Supply Current - mA
V± - Supply Voltage - V
±5
±10
±15
±20

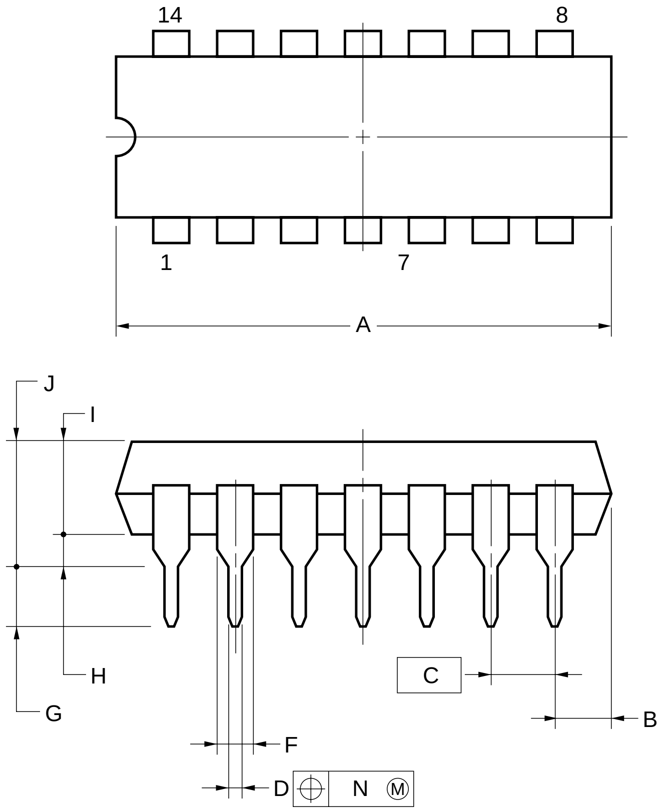

SUPPLY CURRENT
V± = ±15 V
ICC - Supply Current - mA
TA - Operating Ambient Temperature - °C

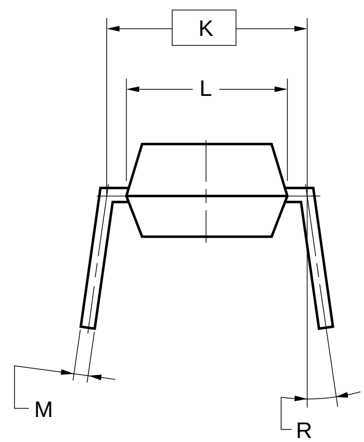

CHANNEL SEPARATION
Channel Separation - dB
f - Frequency - Hz


INPUT EQUIVALENT NOISE VOLTAGE DENSITY
en - Input Equivalent Noise Voltage Density - nV/√Hz
f - Frequency - Hz

★ PACKAGE DRAWINGS (Unit: mm)

14-PIN PLASTIC DIP (7.62 mm (300))





NOTES

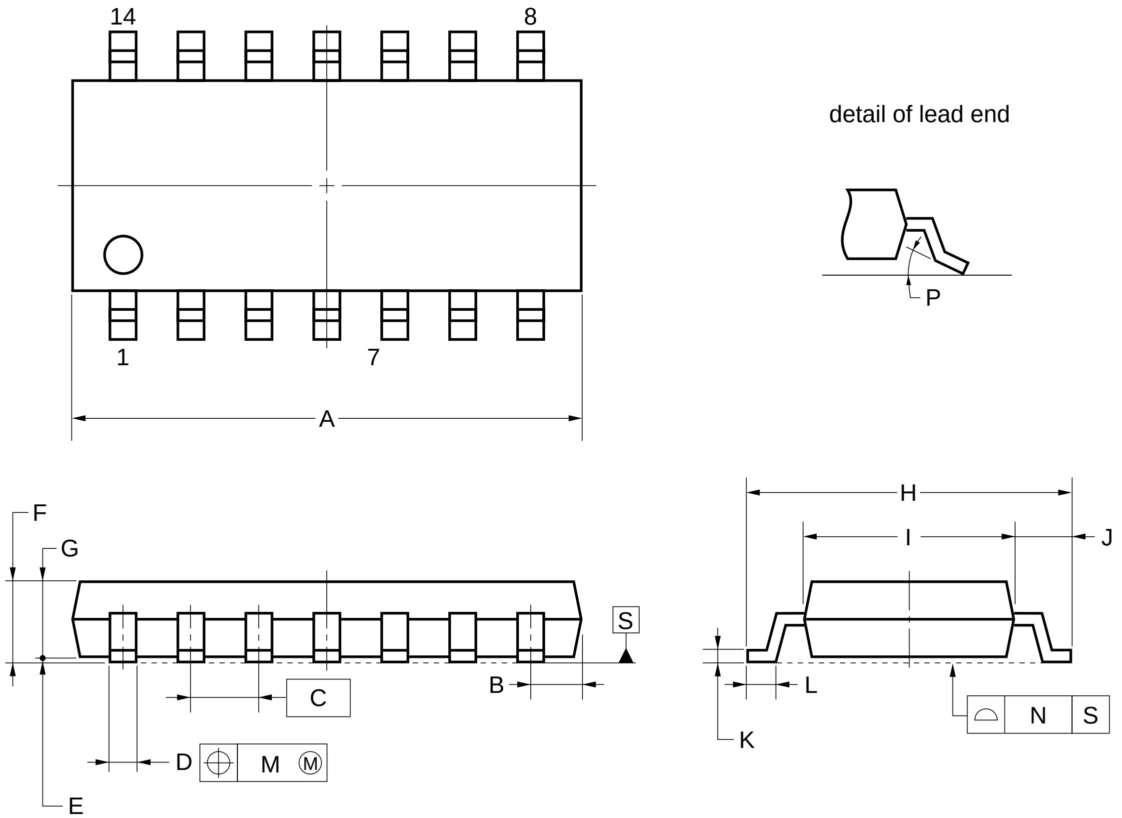
1. Each lead centerline is located within 0.25 mm of its true position (T.P.) at maximum material condition.

2. Item "K" to center of leads when formed parallel.

ITEM	MILLIMETERS
A	19.22±0.2
B	2.14 MAX.
C	2.54 (T.P.)
D	0.50±0.10
F	1.32±0.12
G	3.6±0.3
H	0.51 MIN.
I	3.55
J	4.3±0.2
K	7.62 (T.P.)
L	6.4±0.2
M	$0.25^{+0.10}_{-0.05}$
N	0.25
R	0~15°

P14C-100-300B1-3

14-PIN PLASTIC SOP (5.72 mm (225))



NOTE

Each lead centerline is located within 0.1 mm of its true position (T.P.) at maximum material condition.

ITEM	MILLIMETERS
A	10.2±0.26
B	1.42 MAX.
C	1.27 (T.P.)
D	$0.42^{+0.08}_{-0.07}$
E	0.1±0.1
F	$1.59^{+0.21}_{-0.2}$
G	1.49
H	6.5±0.2
I	4.4±0.1
J	1.1±0.16
K	$0.17^{+0.08}_{-0.07}$
L	0.6±0.2
M	0.1
N	0.10
P	$3°^{+7°}_{-3°}$

S14GM-50-225B, C-6

★ RECOMMENDED SOLDERING CONDITIONS

When soldering this product, it is highly recommended to observe the conditions as shown below. If other soldering processes are used, or if the soldering is performed under different conditions, please make sure to consult with our sales offices.

For more details, refer to below our document "**SEMICONDUCTOR DEVICE MOUNTING TECHNOLOGY MANUAL"(C10535E)**.

Type of Surface Mount Device

μPC4741G2, 4741G2(5): 14-pin plastic SOP (5.72 mm (225))

Process	Conditions	Symbol
Infrared Ray Reflow	Peak temperature: 235°C or below (Package surface temperature), Reflow time: 30 seconds or less (at 210°C or higher), Maximum number of reflow processes: 3 time.	IR35-00-3
Vapor Phase Soldering	Peak temperature: 215°C or below (Package surface temperature), Reflow time: 40 seconds or less (at 200°C or higher), Maximum number of reflow processes: 3 time.	VP15-00-3
Wave Soldering	Solder temperature: 260°C or below, Flow time: 10 seconds or less, Maximum number of flow processes: 1 time, Pre-heating temperature: 120°C or below (Package surface temperature).	WS60-00-1
Partial Heating Method	Pin temperature: 300°C or below, Heat time: 3 seconds or less (Per each side of the device).	–

Caution Apply only one kind of soldering condition to a device, except for "partial heating method", or the device will be damaged by heat stress.

Type of Through-hole Device

μPC4741C, 4741C(5): 14-pin plastic DIP (7.62 mm (300))

Process	Conditions
Wave Soldering (only to leads)	Solder temperature: 260°C or below, Flow time: 10 seconds or less.
Partial Heating Method	Pin temperature: 300°C or below, Heat time: 3 seconds or less (per each lead).

Caution For through-hole device, the wave soldering process must be applied only to leads, and make sure that the package body does not get jet soldered.

[MEMO]

[MEMO]